

NOTES ON SOME FIJIAN WEEDS AND INTRODUCED PLANTS

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A NUMBER of interesting weeds and introduced plants have been found in Fiji in regions other than the leeward coasts and so were mentioned only briefly in my previous articles on this general subject (Proc. Linn. Soc. 154: 92–106. 1943; Jour. Arnold Arb. 25: 397–405. 1944). In the present article notes on some of these plants are given. Some records of weeds common to both the dry and wet zones in Fiji are also given, but no attempt has been made to list all the weeds noticed or collected during various trips outside the dry zones. Some hitherto unpublished records for Fiji are also included. In most such cases the records are based upon specimens which are deposited in the herbarium of either the Royal Botanic Gardens, Kew, the Arnold Arboretum, or the Gray Herbarium.

In the articles mentioned above, published in 1943 and 1944, about 80 records new to Fiji were published; A. C. Smith has also listed new records of weeds and introduced plants in *Sargentia* 1: 1–148. 1942, and in *Bull. Torrey Bot. Club* 70: 533–549. 1943. From these records one might conclude that the number of weeds and introduced plants in Fiji is increasing rapidly, but I do not believe this to be the case. Many of the new records of recent years are from southeastern Viti Levu in the coastal portions of Serua, Namosi, Rewa, Naitasiri, and Tailevu Provinces, especially near the towns of Navua, Nasinu, and Nausori. Although the plants discussed may have been established for years, these districts have not previously been visited by anyone sufficiently interested in the weeds to collect and identify them and to publish the records.

In this paper families are discussed in the order of Bentham & Hooker's *Genera Plantarum*. Collection numbers found in the text italicized and in parentheses refer to the writer's specimens; these numbers are inserted only when the species has not previously been reported from Fiji. Some of the plants discussed were identified by members of the staff of the Royal Botanic Gardens, Kew, to whom I am grateful. Dr. E. D. Merrill and Dr. A. C. Smith, of the Arnold Arboretum, have identified most of the new records and have assisted me in the preparation of this article.

PORTULACACEAE

Talinum paniculatum (Jacq.) Gaertn.

In *Bull. Torrey Bot. Club* 70: 537. 1943, Smith states that this species has been recorded, in Fiji, only from the island of Ovalau. During 30 years' collecting in Fiji I have never seen it except in this one locality, near Levuka. Why this weed should have failed to spread, after its introduction into Fiji at least 80 years ago, and why it should have persisted around Levuka are interesting questions.

MALVACEAE

Sida acuta Burm. f.

This species has increased rapidly in recent years in Mba and Ra Provinces, Viti Levu, especially in open hilly country and sometimes to the exclusion of everything else. What would appear to be the earliest collection of this plant in Fiji is *Greenwood 99*, collected at Lautoka, Viti Levu, and identified and deposited at the Royal Botanic Gardens, Kew.

LEGUMINOSAE

Albizzia Lebbeck (L.) Benth.

Vanua Mbalavu; collected by Mrs. J. D. Tothill.

Acacia sp.

Near Varoko, Mba Province, Viti Levu (1182). This is apparently a recent arrival in the Colony and, as far as I know, occurs only at this one locality, where efforts are being made to eradicate it before it spreads. It grows to 12 feet high and is armed with strong spines.

Desmanthus virgatus (L.) Willd.

Lautoka, Mba Province, Viti Levu, near sea-level.

Cassia Leschenaultiana DC.

Near Tawarau, road from Lautoka to Rarawai, Mba Province, Viti Levu (1183); also near Lautoka, alt. about 180 m. (1183A). This species attains a height of 5 feet and appears to prefer well-drained, sloping ground.

Desmodium triflorum (L.) DC.

Near Nasinu, Naitasiri Province, Viti Levu. Also seen in several places in Tailevu Province but not collected there.

Alysicarpus vaginalis (L.) DC.

Near Nasinu, Naitasiri Province, Viti Levu.

Lourea vespertilionis (L.f.) Desv.

Mango and Lakemba Islands. The only previous Fijian record (*Greenwood* in *Proc. Linn. Soc.* 154: 96. 1943) is from Penang, Ra Province, Viti Levu. The specimens from Mango and Lakemba were collected by Mrs. J. D. Tothill and identified at Kew.

ROSACEAE

Chrysobalanus Icaco L.

Fairly plentiful in parts of Naitasiri Province, Viti Levu, especially between Nasinu and Nausori; also just above high-water mark in sand, Naitonitoni Beach, Serua Province, Viti Levu. This is one of the plants which A. de Candolle considered as probably being spread by ocean currents (*Hemsley, Bot. Voy. Challenger 1* (4): 279. 1885).

CRASSULACEAE

Bryophyllum pinnatum (Lam.) Kurz.

On flat top of large rock near creek, alt. about 1800 ft., western slopes of Mt. Evans Range, Mba [formerly Lautoka] Province, Viti Levu; no specimen collected.

MYRTACEAE

Psidium littorale Raddi.

Near sea-level on flat land between the Navua River and the Serua hills, Serua Province, Viti Levu. Since first recording this species, in Jour. Arnold Arb. 25: 397. 1944, I have heard that it was originally planted in the mentioned locality. However, it was quite naturalized when collected there in 1943.

TURNERACEAE

Turnera ulmifolia L.

Mango Island: *R. J. Lever*. Mr. Lever, Government Entomologist, collected this material in 1945; he informed me that he had also seen this species at Levukā, Ovalau. The only other published Fijian record is from Thakaundrove on Vanua Levu (*Sargentia* 1: 64. 1942).

CUCURBITACEAE

Momordica Charantia L.

Waste places, Navua, Serua Province, Viti Levu.

Coccinea cordifolia (L.) Cogn.

First recorded from Fiji in Jour. Arnold Arb. 25: 400. 1944, from the Lautoka district. Although it has not yet been noticed elsewhere, this species is starting to spread in the vicinity of Lautoka, Mba Province, Viti Levu. It prefers open sunny places, where it covers shrubs and small trees. It may become a pest in the cane-fields by smothering the cane or causing it to fall, as do *Quamoclit coccinea* (L.) Moench and *Q. pennata* (Desr.) Boj.

CACTACEAE

Opuntia vulgaris Mill.

Seashore near Tavua, Mba Province, Viti Levu. Recorded by Mr. B. E. V. Parham in Agric. Jour. Fiji 18: 56. 1947, where it is stated that all existing stands have been eradicated.

RUBIACEAE

Borreria laevis (Lam.) Griseb.

In damp open grassland at Nandarivatu, Mba [formerly Tholo North] Province, Viti Levu, alt. about 2700 ft.; also at Nasinu, Naitasiri Province, Viti Levu.

COMPOSITAE

Synedrella nodiflora (L.) Gaertn.

Navua, Serua Province, and also near Nasinu, Naitasiri Province, Viti Levu.

Cosmos caudatus H. B. K.

Near Nasinu, Naitasiri Province, Viti Levu.

Tithonia diversifolia (Hemsl.) A. Gray

Waste places, Navua, Serua Province, Viti Levu.

Erigeron pusillus Nutt.

In coral sand in depressions just behind the coast near Saweni, near Lautoka, Mba Province, Viti Levu; on open steep grassy western slopes of Mt. Evans Range, alt. about 2500 ft., Mba [formerly Lautoka] Province, Viti Levu.

Erigeron floribundus (H. B. K.) Sch.-Bip.

In Proc. Linn. Soc. 154: 99. 1943, I recorded this plant as growing up to 1000 ft. elevation. Actually it occurs up to 2700 ft. and is very common at about 2000 ft. on ground used by the Fijians for crops in the Lautoka section of Mba Province, Viti Levu.

Elephantopus mollis H. B. K.

Nandarivatu, Mba [formerly Tholo North] Province, Viti Levu, alt. about 3000 ft. In open sunny places and also in thick forest wherever a clearing occurs or the track is wide enough to admit a certain amount of sunlight.

Distreptus spicatus (Aubl.) Cass.

Sandy soils near coast, Lautoka, Mba Province, Viti Levu (1132).

Spilanthes acmella (L.) Murr.

Along roadside on lower slopes, Serua hills, Serua Province, Viti Levu; waste land near Nausori, Tailevu Province, Viti Levu. The only previous record for Fiji (Sargentia 1: 141. 1942) is from Thakaundrove Province, Vanua Levu.

Taraxacum officinale Weber.

Open grassland, Nandarivatu, Mba [formerly Tholo North] Province, Viti Levu (1172).

Struchium sparganophorum (L.) Kuntze.

In low-lying wet places near Nasinu, alt. about 100 ft., Naitasiri Province, Viti Levu (1107).

LOBELIACEAE

Isotoma longiflora (L.) Presl.

Damp places in Rewa, Tailevu, and Naitasiri Provinces, Viti Levu; also at Nandarivatu, alt. about 2700 ft., Mba [formerly Tholo North] Province, Viti Levu.

Lobelia zeylanica L.

Damp shady places, near road hills between Navua and Suva in Namosi Province, Viti Levu; shady places, Serua hills, Serua Province, Viti Levu; in wet places, sometimes in standing water, near Nasinu, Naitasiri Province, Viti Levu. When not in flower, this plant somewhat resembles *Cardamine sarmentosa* Forst., which also grows in water and other very wet places and is gathered and eaten as a water-cress in Fiji.

APOCYNACEAE

Allamanda cathartica L.

Open sunny places near Nasinu, alt. about 100 ft., Naitasiri Province,

Viti Levu (1195). This commonly cultivated garden plant was found covering several acres near Nasinu, where there had evidently been a house at one time. It was covering the clearing and climbing over small trees near by, appearing quite naturalized.

CONVOLVULACEAE

Ipomoea obscura (L.) Ker.

In shady places near sea-level, Lautoka, Mba Province, Viti Levu (821). First noticed by me about 1935, this species thus far shows no tendency to spread or to become a bad weed.

Cuscuta australis R. Br.

The Director, Royal Botanic Gardens, Kew, informs me (in litt.) that the record of *C. densiflora* Hook. f. given by Miss Gibbs from Nandarivatu refers to this species.

SOLANACEAE

Browallia americana L.

Near Nasinu, Naitasiri Province, Viti Levu (1116). A garden escape, found semi-naturalized about European houses in several places in Naitasiri and Tailevu Provinces. It was also seen as a weed in gardens at Nandarivatu, alt. about 2700 ft., Mba [formerly Tholo North] Province, Viti Levu.

SCROPHULARIACEAE¹

Scoparia dulcis L.

Near Nasinu, Naitasiri Province, and near Nausori, Tailevu Province, Viti Levu.

Bonnaya veronicaefolia (Retz.) Spreng.

Nausori, in damp places, Tailevu Province, Viti Levu; collected by Mr. R. Veitch (330). I am indebted to the Director, Royal Botanic Gardens, Kew, for the identification of this plant, which was collected in May, 1921. I did not see it during a visit to Nausori a few years ago, and the record was overlooked when I prepared the previous weed articles.

Lindernia anagallis (Burm.f.) Pennell.

Near Nasinu, Naitasiri Province, Viti Levu, in wet places. The only other record for Fiji (Jour. Arnold Arb. 25: 397. 1944) is from Serua Province, Viti Levu.

Lindernia diffusa (L.) Wettst.

Covering wet banks at side of road, hills between Navua and Suva in Namosi Province, Viti Levu.

Lindernia microcalyx Pennell & Stehlé.

In wet places and sometimes in standing water, near Nasinu, Naitasiri Province, Viti Levu (1110).

¹ Dr. F. W. Pennell, of the Academy of Natural Sciences, Philadelphia, has kindly provided several of the identifications listed in this family.

Torenia polygonoides Benth.

Damp shady places near Nasinu, Naitasiri Province, Viti Levu (1099).

Mazus japonicus (Thunb.) Kuntze.

Damp shady banks near Nausori, Tailevu Province, Viti Levu (1105).

Angelonia angustifolia Benth.

Damp open sunny places between Mulamula and Yavuna, alt. about 500 ft., Mba [formerly Nandi] Province, Viti Levu; open hillsides between Lautoka and Mt. Evans, alt. about 1800 ft., Mba [formerly Lautoka] Province, Viti Levu (25). This plant is commonly grown in gardens in Fiji by Europeans, Fijians, and Indians. *Greenwood 25* was collected in 1920 and identified at Kew, but I did not see the plant again in this locality and therefore did not include it in my articles on the weeds and adventive flora of the leeward coasts. However, in June, 1947, I observed the species flowering well and apparently naturalized at two places several miles apart inland from Nandi, and therefore it should doubtless be recorded here.

ACANTHACEAE

Asystasia gangetica (L.) T. Anders.

Near Nasinu, Naitasiri Province, Viti Levu. First noticed in Fiji at Levuka, Ovalau, in 1927.

Thunbergia alata Boj.

Near Thuvu, Nandronga & Navosa Province, Viti Levu. Commonly called Black-eyed Susan, this creeper has a corolla of which the throat is sometimes black and sometimes not.

Blechum pyramidatum (Lam.) Urb. [*B. Brownei* (Sw.) Juss.]

Near Nasinu, Naitasiri Province, Viti Levu.

LABIATAE

Hyptis pectinata (L.) Poit.

Open places on hills, road from Navua to Suva in Namosi Province, Viti Levu. During a trip around Viti Levu by car this species was not noticed in Serua Province, but it occurs from the cited locality in Namosi Province through Rewa, Naitasiri, and Tailevu Provinces where the road passes. During such a trip in 1945 the northernmost plants along the road were seen about two miles south of the turn-off to Ellington Wharf, Ra Province.

Salvia coccinea Juss. ex Murr.

Listed by Gibbs (in Jour. Linn. Soc. Bot. 39: 161. 1909) from the Nandrau Valley, alt. about 1000 ft., Nandronga & Navosa [formerly Tholo North] Province, Viti Levu. The species does not otherwise appear to have been recorded from Fiji.

PLANTAGINACEAE

Plantago major L.

Nandarivatu, alt. about 2700 ft., Mba [formerly Tholo North] Province, Viti Levu. Seemann, in *Flora Vitiensis*, notes this species as common,

but during the past 30 years I have seen it only at Nandarivatu and Suva. It has not been noticed on the leeward coasts of Viti Levu or Vanua Levu.

AMARANTHACEAE

Iresine Herbstii Hook.

This is another species listed by Gibbs (in Jour. Linn. Soc. Bot. 39: 161. 1909) from the general vicinity of Nandarivatu, Viti Levu, which appears not to have been collected — or at least not recorded — since her report.

CHENOPODIACEAE

Chenopodium ambrosioides L.

Nandi, Mba [formerly Nandi] Province, Viti Levu. Mr. B. E. V. Parham has published an interesting note on this species in Agric. Jour. Fiji 17: 24. 1946. Here the plant is noted as a new record for Fiji, but it was earlier listed by Horne (A Year in Fiji, 259. 1881) without discussion. At present it appears to be confined to the Nandi district.

PIPERACEAE

Peperomia pellucida (L.) H. B. K.

In shady places near Nasinu, Naitasiri Province, Viti Levu.

EUPHORBIACEAE

Phyllanthus urinaria L.

Near Navua, Serua Province, Nasinu, Naitasiri Province, and Nausori, Tailevu Province, Viti Levu. Formerly recorded from Nandarivatu, in Sargentia 1: 46. 1942.

Phyllanthus Niruri L.

Near Navua, Serua Province, Viti Levu.

Euphorbia Peplus L.

Nandarivatu, alt. about 2700 ft., Mba [formerly Tholo North] Province, Viti Levu (1171). A weed in gardens and on cultivated ground.

URTICACEAE

Pilea microphylla (L.) Liebm.

Along roadside in shade, hills between Navua and Suva, Namosi Province, Viti Levu; Nandarivatu, alt. about 2700 ft., Mba [formerly Tholo North] Province, Viti Levu; Lautoka, near sea-level, Mba Province, Viti Levu.

SALICACEAE

Salix sp.

On bank of sand and stones at edge of river a few miles below Tumbenasolo, Mba [formerly Nandi] Province, Viti Levu (1191). The family has apparently not previously been recorded from Fiji.

IRIDACEAE

Sisyrinchium micranthum Cav.

F. M. Bailey (Weeds and suspected poisonous plants of Queensland,

192. 1907) states that this species is believed to be poisonous and that it causes violent scouring in stock. The plant is very small and, when not in flower, is difficult to discern among grasses. It is recorded thus far in Fiji only from the vicinity of Nandarivatu (in Bull. Torrey Bot. Club 70: 535. 1943), but it may be expected to spread over some coastal pastures by means of flood waters.

AMARYLLIDACEAE

Agave sisalina Perr.

Open hillsides at about 500 ft., near Thuvu, Nandronga & Navosa Province, Viti Levu.

PONTEDERIACEAE

Monochoria hastata (L.) Solms.

Mr. B. E. V. Parham records this plant (as *M. hastaeifolia*) for the first time from Fiji, in Agric. Jour. Fiji 18: 39. 1947. He states that it occurs throughout the Navua district, in all parts of the lower Rewa, and in rice fields between Samabula and Suva Point. It was pointed out to me by Mr. Parham at Nanduruloulou and I also saw it near Nasinu (both in Naitasiri Province, Viti Levu), but specimens were not collected.

CYPERACEAE

Cyperus Iria L.

Lautoka, Mba [formerly Lautoka] Province (806), and Wangandra, Mba [formerly Nandi] Province (806A), Viti Levu. This species was first noticed by me at Wangandra in 1932 and near Lautoka in 1940. It is a bad weed in rice fields in the Lautoka and Nandi districts, springing up and dying down during the wet season. It has been seen at about 1000 ft. elevation on hills near Lautoka.

Cyperus difformis L.

In standing water near Nasinu, Naitasiri Province, Viti Levu.

Cyperus compressus L.

The annual form of this, mentioned in Proc. Linn. Soc. 154: 105. 1943, appears to be confined in Fiji to the vicinity of Lautoka, in my observation. A perennial form, up to 10 or 12 inches high, is found in Mba [Lautoka], Nandronga & Navosa, Naitasiri, and Tailevu Provinces, Viti Levu, usually in damp or wet grassland.

Cyperus alternifolius subsp. *flabelliformis* (Rottb.) Kükenth.

Banks of Navua River near Navua, Serua Province, Viti Levu.

Cyperus Haspan L.

Common in drains and other wet places in Naitasiri and Tailevu Provinces, Viti Levu.

Cyperus distans L. f.

Near Nausori, Tailevu Province, Viti Levu.

Scirpus Purshianus Fernald [*S. debilis* Pursh, non Lam.]

In standing water in drains near Navua, Serua Province, Viti Levu

(980). During a month's visit at Navua this species was observed at only one place and was not plentiful there.

Eleocharis geniculata (L.) R. & S.

In coral sand in depressions just behind the coast near Saweni, near Lautoka, Mba Province, Viti Levu.

Fimbristylis miliacea (L.) Vahl.

In standing water in drains, near Nasinu, Naitasiri Province, Viti Levu.

GRAMINEAE²

Ischaemum aristatum L. [*I. ciliare* Retz.].

Near Nasinu, Naitasiri Province, Viti Levu.

Ischaemum timorense Kunth.

The record of this species in Fiji, noted in Bull. Torrey Bot. Club 70: 534. 1943, was based on *Greenwood 817*, collected in 1939 from roadside on the Navua flats between Navua and Suva in Serua [not Rewa as previously stated] Province, Viti Levu. In May, 1943, the species was collected all along these flats, on the banks of the Navua River (Serua Province), and also on the hills along the road from Navua to Suva in Namosi Province.

Ischaemum rugosum var. *distachyum* (Cav.) Merr.

In soak area near creek in open, western slopes of Mt. Evans Range, Mba [formerly Lautoka] Province, Viti Levu (1038B).

Sorghum halepense (L.) Pers.

Lambasa district, Mathuata Province, Vanua Levu. This record should have been included in my earlier articles but it was overlooked. The species has been present near Lambasa for over 30 years.

Themeda quadrivalvis (L.) Kuntze.

Roadside between Lautoka and Rarawai, Mba Province; hills at about 1200 ft. alt., between Lautoka and Mt. Evans Range, Mba [formerly Lautoka] Province, Viti Levu.

Brachiaria subquadriparia (Trin.) Hitchc.

Damp places near sea-level, Lautoka, Mba Province (93A), and near Nausori, Tailevu Province (93B), Viti Levu. This species has been combined by some botanists with *B. distachya* Stapf; I am indebted to Mrs. Chase for pointing out the differences. She writes: "It is related to *B. distachya* Stapf but has more numerous racemes and slightly longer spikelets. It is more frequent in the islands than is *B. distachya*, to which it has commonly been referred." Much of the material listed by Summerhayes & Hubbard (Kew Bull. 1927: 32; 1930: 256) under *B. distachya* will prove to represent *B. subquadriparia*. Apparently *B. distachya* prefers damper places than *B. subquadriparia* and has a more compact growth of a lighter green color.

² For some of the listed identifications of grasses I am indebted to Mrs. Agnes Chase and Mr. J. R. Swallen, of the U. S. National Herbarium.

Brachiaria erucaeformis (J. E. Sm.) Griseb.

On banks of sand and stones along creek in open, alt. about 200 ft., Lautoka, Mba Province, Viti Levu (1081, depauperate). Previously known, in the Pacific, from only the Philippines and Guam, according to Mrs. Chase.

Axonopus compressus (Sw.) Beauv.

Fairly common near Navua, Serua Province, near Nasinu, Naitasiri Province, and near Nausori, Tailevu Province, Viti Levu.

Echinochloa stagnina (Retz.) Beauv.

In drains, near Nausori, Tailevu Province, Viti Levu. The only previous record from Fiji (Jour. Arnold Arb. 25: 397. 1944) was from drains near Navua, Serua Province, Viti Levu.

Cyrtococcum oxyphyllum (Hochst. ex Steud.) Stapf.

In open places in forest along road between Navua and Suva, Namosi Province, and in shady places near Nasinu, Naitasiri Province, Viti Levu.

Setaria barbata Kunth.

Levuka, Ovalau, in shady places. Although the species was apparently quite common at Levuka when I was there in 1932, it has been previously recorded, in Fiji, only from Koro (Kew Bull. 1930: 260).

Setaria geniculata (Lam.) Beauv.

On open flat rock at extreme western end of Mt. Evans Range, alt. about 3400 ft., Mba Province, Viti Levu (962, 962A). The only previous record of this species in Fiji (in Sargentia 1: 6. 1942) is based on *Degener & Ordonez 13514*, which I believe to represent *S. pallidifusca* (Schumacher) Stapf & Hubbard, a tall annual grass; *S. geniculata* is perennial.

Setaria pallidifusca (Schumacher) Stapf & Hubbard.

Near sea-level near Navua, Serua Province, Viti Levu.

Isachne dispar Trin.

In wet ground in open beside creek, alt. about 2700 ft., Nandarivatu, Mba [formerly Tholo North] Province, Viti Levu (1178).

Eragrostis pilosa (L.) Beauv.

Navai, near Nandarivatu, alt. about 2500 ft., Mba [formerly Tholo North] Province, Viti Levu.

Arundo Donax L.

Along road, hills between Navua and Suva, Namosi Province, Viti Levu; along creek, lower western slopes of Mt. Evans Range, alt. about 1800 ft., Mba [formerly Lautoka] Province, Viti Levu.

COLONIAL SUGAR REFINING CO.,

LAUTOKA, VITI LEVU, FIJI.